

### **REMARKS**

Claims 1-26 are pending in the present application. Claims 1 and 14 were amended. Reconsideration of the claims is respectfully requested.

On May 16, 2005, Applicant filed a Response to a previous Office Action in the above-identified application. All remarks and comments in such Response are incorporated herein by reference.

#### **I. 35 U.S.C. § 102, Anticipation**

The Examiner has rejected claims 1-26 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,243,510, to Rauch. This rejection is respectfully traversed.

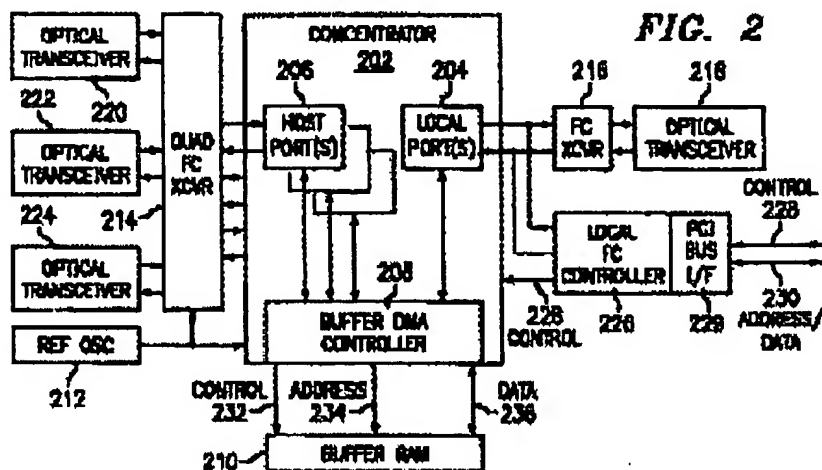
#### **II. Applicant's Invention**

As indicated by its title, Applicant's invention is expressly directed to a fibre channel (FC) concentrator. In making his invention, Applicant sought to eliminate need for a switch, in connecting a plurality of fibre channel hosts to a single fibre channel link. Applicant recognized that achieving this objective would reduce bandwidth requirements, by allowing each host to use only a portion of the link bandwidth. These teachings of Applicant are clearly set forth in his specification, such as at page 5, lines 3-11 and page 5, lines 17-25:

The present invention provides an apparatus and method by which to directly connect a plurality of hosts to a single fibre channel (FC) link without the need of an external switch. This provides connectivity benefits in which the hosts are using only a portion of the link bandwidth. Hardware may be used to allow the hosts to transparently share the FC link into an FC controller. This hardware may acts as a FC frame multiplexer/demultiplexer with buffering capability.

A solution to mitigation of the costs of the data path is to provide connectivity for more than a single FC port so that the power of the data path may be fully utilized. If data paths are shared by FC ports with small incremental costs additions and no significant reduction in performance, a greater host/device connectivity may be provided which results in a lower cost per FC port.

An embodiment of Applicant's invention is shown by Figure 2 of the application and is described, for example, at page 6, lines 5-23, shown below:



concentrator device 202 may be transparent to external FC hosts/devices, require little or no management, data need only flow between the host port(s) and the local FC port and may support class 2 and class 3 frame exchanges. Concentrator 202 acts as a physical layer end-point and provides a bridging function to move frames between external links and local links.

In this example, concentrator 202 may consist of a local FC port 204 and a plurality of host ports 206. One local port is shown in this example but any number of local ports may be employed in accordance with a preferred embodiment of the present invention. In addition, three host ports are shown in this example but any number of host ports may be employed in accordance with a preferred embodiment of the present invention. Furthermore, concentrator 202 may also consist of buffer direct memory access (DMA) controller 208.

Concentrator 202 may achieve a variety of states during the first stage of an initialization process,

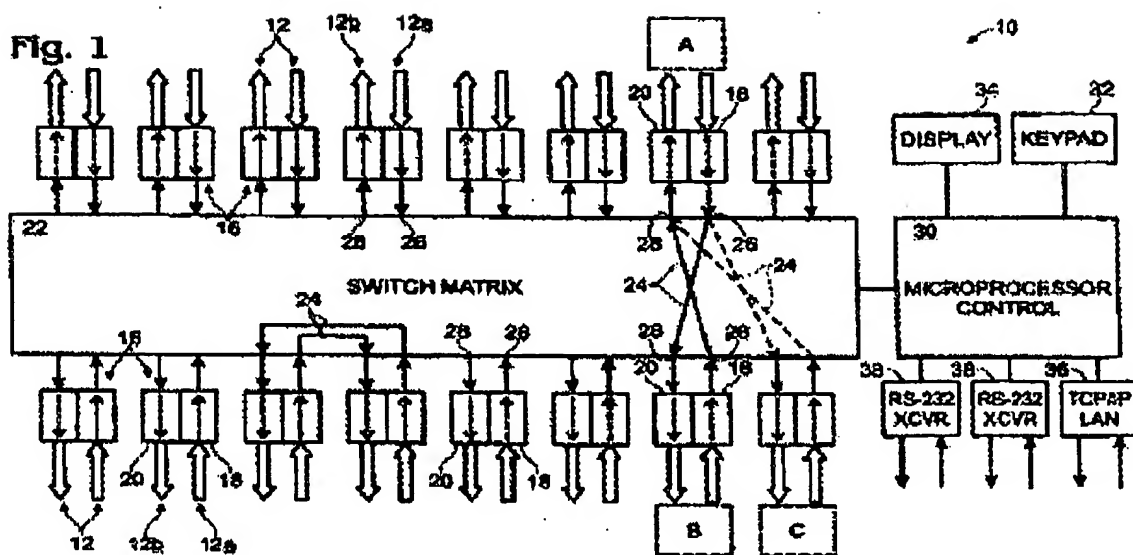
These teachings clearly disclose that concentrator 202 of Figure 2 provides a data bridge to move frames between host or external fibre channel links, such as transceivers 214 and 220-224, and a local FC link, such as transceiver 216. All connections to concentrator 202 are made through fibre channel ports 204 and 206, and concentrator 202 has both a buffer DMA controller 208 and a buffer RAM 210. Concentrator 202, functioning as a data bridge, must also be initialized, as emphasized at page 6, lines 22-23.

Important features of Applicant's invention, as described above, are recited in Claim 1, as follows:

1. (Currently Amended) A method in a data processing system for transferring data from a plurality of host data links to at least one local data link, the method comprising the steps of:
  - initializing a data bridge, wherein the data bridge is functionally connected on a first end to the plurality of host data links and on a second end to the at least one local data link, and wherein all connections to the data bridge are made through fibre channel ports;
  - operating the data bridge to capture credit parameters, for use in determining if a first data link within the plurality of host data links and a second data link within the at least one local data link initiate a login parameter; and
  - automatically transferring the data from a source data link within the plurality of host data links to a target data link within the at least one local data link based on the login parameter, wherein the data transferred from the source data link is stored in a memory buffer device, and wherein the memory buffer device is connected to the data bridge.

### **III. Principal Teachings of Cited Rauch Reference**

The Rauch reference, as stated in the first sentence of its Abstract, is directed to an arrangement for connecting an optical input to one or more optical outputs. This arrangement is shown by Figure 1 of Rauch, and principal characteristics thereof are taught at col. 4, lines 28-51 and col. 5, lines 31-34, set forth below:



Each transceiver 16 includes a receiver portion 18 and a transmitter portion 20. Receiver portions 18 are associated with input ports 12a and configured to receive optical data signals via the input ports. The receiver portions are adapted to convert the optical signals into corresponding electrical data signals containing the same information as contained in the optical signals. Similarly, transmitter portions 20 are associated with output ports 12b and configured to transmit optical data signals via the output ports. The transmitter portions are adapted to receive an electrical signal and convert it to a corresponding optical data signal for transmission via the output port. The corresponding optical signal contains the same information as contained in the electrical signal. (Emphasis added)

System 10 also includes electronic circuitry such as switch matrix 22 which is configured to form an electrical data path or connection 24 between one or more selected optical receivers 18 and one or more selected optical transmitters 20. Switch matrix 22 includes a plurality of electrical inputs 26 and a plurality of electrical outputs 28. Each electrical input 26 is connected to receive electrical signals from an optical receiver 18, while each electrical output 28 is connected to transmit electrical signals to an optical transmitter 20.

It will be appreciated that switch matrix 22 may be any type of circuitry suitable for forming electrical data paths between selected electrical inputs and selected electrical outputs. (Emphasis added)

From the above excerpts it is seen that Rauch discloses a switch matrix 22, connected to receiver portions 18 and transmitter portions 20. Each receiver portion is adapted to convert optical signals received through fiber optic cables into corresponding electrical signals. Similarly, each transmitter portion converts an electrical signal back into its corresponding optical signal form. Switch matrix 22 may be any type of circuitry "suitable for forming electrical data paths between selected electrical inputs and selected electrical outputs". Thus, the teachings of Rauch are directed to a generalized switch, for use with optical-to-electrical and electrical-to-optical converters. Clearly, the Rauch switch is a type of "external switch" such as Applicant sought to eliminate, as taught at page 5, lines 3-6 of the application, in connecting fibre channel hosts to a fibre channel link. Moreover, Rauch fails to teach that its switch provides any bandwidth reduction benefit in connecting fibre channel components, as is achieved by Applicant's invention.

#### **IV. Response to Rejection of Claim 1**

A prior art reference anticipates a claimed invention under 35 U.S.C. § 102 only if every element of the claimed invention is identically shown in that single reference, arranged as they are in the claims. In re Bond, 910 F. 2d 831, 832, 15 U.S.P.Q. 2d 1566, 1567 (Fed Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. In re Lowry, 32 F. 3d 1579, 1582, 21 U.S.P.Q. 2d 1031, 1034 (Fed Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. Kalman v. Kimberly-Clark Corp., 713 F. 2d 760, 218 U.S.P.Q. 781 (Fed Cir. 1983).

After reviewing the cited Rauch reference and comparing the teachings thereof with Applicant's Claim 1, Applicant respectfully submits that Rauch does not teach every element of Claim 1, arranged as they are therein. Specifically, Rauch does not teach the following features or limitations now recited by Claim 1, in the combination thereof:

(1) All connections to the data bridge of Claim 1 are made through fibre channel ports. (Hereinafter "Feature (1)")

(2) Initializing a data bridge connected on a first end to a plurality of host data links and on a second end to at least one local data link. (Hereinafter "Feature (2)")

(3) Operating the data bridge to capture credit parameters, for use in determining if a first data link within the plurality of host data links and a second data link within the at least one local data link to initiate a login parameter. (Hereinafter "Feature (3)")

**A. Feature (1) Distinguishes Claim 1 over Rauch**

Figure 1 of the application clearly demonstrates that the data bridge of Applicant's claim 1 is connected only to fibre channel (FC) ports and links. Figure 1, shown below, depicts the data bridge as concentrator 100. At page 5, lines 26-28, the application teaches that "concentrator 100 merges FC point to point physical links into a single FC link 104. Thus, the data bridge operates only in accordance with the fibre channel (FC) protocol. Moreover, all connections to the data bridge must be made through fibre channel ports.



In the Office Action, at pages 2-3, the Examiner stated the following:

(Rauch teaches of a data bridge (matrix switch 22 of figure 1), where the bridge is functionally connected on a first end to the plurality of host data links and on a second end to the at least one local data link; (Rauch teaches of a data bridge, matrix switch 22 of figure 1, where the bridge is functionally connected to a plurality of host data links, such as B and C of figure 1, and a second end connected to a local data link, A.

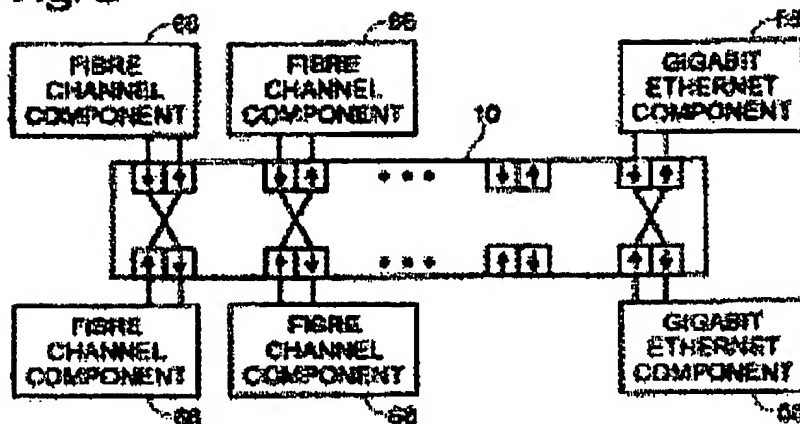
Thus, the Examiner maintains that matrix switch 22 of Rauch shows the data bridge of Applicant's Claim 1. However, in contrast to the teachings of Applicant discussed above, the Rauch reference emphasizes repeatedly that its

system 10, which includes switch 22, functions independently of any communication protocol the data signal may include. This is stressed in Rauch, such as at col. 8, lines 28-54 and Figure 5, set forth as follows:

FIG. 5 illustrates a further aspect of the invention. As described above, system 10 conveys optical data signals between selected data paths without decoding or modifying the data, and therefore functions independently of any communications protocol the data signal may include. As a result, system 10 may be used to convey signals between devices which communicate using any communications protocol. Furthermore, system 10 may simultaneously transmit a plurality of data signals each embodying a different protocol. In the embodiment shown in FIG. 5, patch panel 10 is connected to a plurality of components 66 configured to communicate using the fibre channel communications protocol, as well as a plurality of components 68 configured to communicate using the Gigabit Ethernet protocol. System 10 is controlled to form connections between fibre channel components 66, and to form connections between Gigabit Ethernet components 68. Alternatively, components configured to communicate using other communications protocol may be connected together through system 10.

In the exemplary embodiments described, system 10 has been illustrated as forming point-to-point connections between two devices which communicate with one another. However, it will be appreciated that system 10 may be controlled to create a variety of different arrangements and architectures to enable fiber optic communications between multiple devices. (Emphasis added)

Fig. 5



While Figure 5 shows FC components 66 coupled together through Rauch switching system 10, Figure 5 also shows Gigabit Ethernet components 68 coupled to system 10. Thus, Rauch graphically discloses an essential purpose of its arrangement. As expressly stated at col. 8, lines 52-54, the purpose of Rauch's system 10 is to "create a variety of different arrangements and architectures" (Emphasis added).

It is abundantly clear that such purpose of Rauch is totally incompatible with the Claim 1 requirement that all connections to the data bridge are to be made through Fibre Channel ports, as recited by Applicant's Claim 1. This difference is further stressed by Rauch, such as at col. 8, lines 41-43, wherein it is stated that the components 68 communicate using the Gigabit Ethernet protocol, not the Fibre Channel protocol. Clearly, components requiring a different protocol than Fibre Channel could not connect only through Fibre Channel ports to system 10 or switch 22 of Rauch. Accordingly, Rauch emphatically teaches away from the above Feature (1) of Applicant's Claim 1.

#### B. Feature (2) Distinguishes Claim 1 over Rauch Reference

The above Feature (2) requires initializing the data bridge of Claim 1, which is connected to host data links and at least one local data link. It is thus very important to clearly understand the meaning of the term "initialize".

Attached hereto as Exhibit A is an excerpt from the American Heritage Collegiate Dictionary, Fourth Edition, copyright 2002. The excerpt discloses respective definitions of the term "initialize". Exhibit A also includes copies of the dictionary front cover and a page showing its year of copyright.

It is readily apparent from Exhibit A that the term "initialize" only has meaning in regard to computer science, and applies only to computer components and data processing. Such term is further limited to the tasks of (1) setting a starting value of a variable; (2) preparing or booting a computer or printer for use; and (3) formatting a storage medium. It is to be emphasized that the dictionary of Exhibit A is a non-technical dictionary. Thus, Exhibit A defines the term "initialize" both as it is commonly used, in colloquial speech, and also as it is used by those of skill in the art.

In the Office Action, the Examiner stated the following:

Rauch teaches of initializing said bridge, COL. 4, lines 42-51, and figure 3).

The section of Rauch at col. 4, lines 42-51, previously set forth, is set forth again to emphasize its content:

System 10 also includes electronic circuitry such as switch matrix 22 which is configured to form an electrical data path or connection 24 between one or more selected optical receivers 18 and one or more selected optical transmitters 20. Switch matrix 22 includes a plurality of electrical inputs 26 and a plurality of electrical outputs 28. Each electrical input 26 is connected to receive electrical signals from an optical receiver 18, while each electrical output 28 is connected to transmit electrical signals to an optical transmitter 20.

The above excerpt of Rauch merely describes the common operation of an electrical switch matrix in forming paths between inputs and outputs. Switch matrix 22 clearly is not a computer. While microprocessor 30 may control its operation, switch matrix 22 performs no data processing function. Neither does switch matrix 22 perform any of the initializing functions set forth in Exhibit A, such as setting a starting value or preparing a computer for use. Moreover, neither in the above section nor elsewhere does Rauch use the term "initialize" to describe any action or operation of switch matrix 22. Accordingly, for at least all

the above reasons, Applicant considers that Rauch fails to show the above Feature (2) of Claim 1.

**C. Feature (3) Distinguishes Claim 1 over Rauch Reference**

Applicant teaches that the data bridge or concentrator of his disclosure plays an essential role in the login process for respective links, in order to enable them to exchange data. As is well known by those of skill in the art, the fibre channel protocol establishes a flow control arrangement using buffer to buffer credit information, to allow the data exchange to take place. The credit information is necessary to ensure that a data recipient has available buffer capacity. Accordingly, Applicant's data bridge is constructed to participate in flow control, when login is initiated, by capturing buffer to buffer credit parameters. This is taught in the application, such as at page 11, line 30 through page 12, line 7:

concentrator 304 is involved in buffer to buffer flow control across external link 308 and local link 310. However, concentrator 304 may not be involved in end to end flow control, therefore, acc frames may be forwarded in a similar manner as any other frame. Concentrator 304 monitors for login frames such as login frames 312 and 324 and captures remote buffer to buffer credit parameters for each link as the link is logged in.

Feature (3) of Applicant's Claim 1 recites operating the data bridge to capture credit parameters, as described above. It is very apparent that the switch matrix 22 of Rauch, which is simply designed to form electrical paths between inputs and outputs, neither shows nor suggests this feature. Thus, Rauch fails to disclose the above Feature (3) of Claim 1.

**V. Response to Rejection of Claims 2-13**

Claims 2-13 respectively depend from Claim 1, and are each considered to patentably distinguish over the art for the reasons given in support thereof.

Claim 2 is considered to further distinguish over the art by reciting a memory buffer device connected between the source data link and the target data link, in the over-all combination of Claim 2. In rejecting Claim 2, the Examiner stated the following, at pages 3-4:

5. As to claims 2 and 15, Rauch discloses a method and apparatus, where the data transferred from the source link is stored in a memory buffer device is connected to the data bridge via a memory buffer controller and the memory buffer device and the memory buffer controller are both connected to the source data link through an input port of the data bridge, and are also both connected between the source data link and the target data link (Rauch teaches in figure 4 of source data link 41, a server that comprises a memory buffer. The memory controller is the controller (30) associated with bridge 10a, as illustrated in figure 1. Both devices are connected together by bridge 10a. The target data link is tape back up 44 of figure 4.

The Examiner thus makes reference to a server 41 of Rauch that is connected to a patch panel 10a. However, Figure 4 shows server 41 connected only to a single input or output of panel 10a. Clearly, server 41 is not connected between a source data link and a target data link that are both connected to a data bridge, as recited by Claim 2.

Claim 6 is considered to further distinguish over the art in reciting the step of determining whether an initiating sequence signal is received by the first and second data links, in the over-all combination of Claim 6. The Examiner stated the following at page 5 of the Office Action, in rejecting Claim 6:

determining whether an initiating sequence signal is received by the first data link and the second data link;  
(Rauch teaches the pathway set in figure 3. Steps 110 through 130 is a determination phase of this set up)

It is readily apparent that the Claim 6 step of "determining whether an initiating sequence signal is received" recites a decision making task, which anticipates that an initiating sequence signal may be received, or may not be received. In the above statement, the Examiner indicates that Rauch teaches this step of Claim 6 at steps 110, 120 and 130 of Figure 3 of Rauch. Step 110 recites "selecting a first optical data path for a plurality of optical data paths". Step 120 recites "selecting a second optical data path for a plurality of optical data paths". Step 130 recites "forming an electrical data path between the first optical data path and the second optical data

path". It is readily apparent that the actions of "selecting" and "forming" recited by these steps of Rauch are not determining or decision making steps at all. There is no unknown or uncertain aspect to any of these steps. Accordingly, both separately and in any combination, steps 110 through 130 of Rauch's Figure 3 fail to teach the determining step of Applicant's Claim 6.

Claim 9 is considered to further distinguish over the art in reciting that the data bridge is reset, if the plurality of host data links and at least one local data link complete an off-line state protocol. The Examiner stated the following at page 6 of the Office Action, in rejecting Claim 9:

12. As to claims 9 and 22, Rauch discloses a method or apparatus that resets the data bridge should the involved data links be in an off-line state. (Rauch teaches that controller 30 may be configured to control the bridge based on any criteria which would include said reset, COL. 5, lines 58 - 60).

The above-cited section of Rauch, at col. 5, lines 58-60, states that controller 30 may be configured to control the switch matrix based on programmed criteria, not on any criteria. Clearly, any such programmed criteria must be limited to the capabilities of matrix switch 22 that are disclosed by Rauch. As discussed above, Rauch teaches that switch matrix 22 is merely a device for forming and re-forming electrical paths between inputs and outputs. Rauch nowhere teaches that such device would be reset if host data links and a local data link completed an off-line state protocol, as recited by Claim 9.

Claim 13 is considered to further distinguish over the art in reciting the step of automatically transferring the data from a source data link within the plurality of host data links to a buffer device if the data bridge is in a lockout mode. The Examiner stated the following at page 7 of the Office Action, in rejecting Claim 13:

16. As to claims 13 and 26, Rauch discloses a method and apparatus that automatically transfers the data from a source data link within the plurality of host data links to a buffer device if the data bridge is in a lockout mode (Rauch teaches that controller 30 may be configured to control the bridge based on any criteria which would include said lockout, COL. 5, lines 58 - 60).

In rejecting Claim 13, the Examiner uses the same excerpt from Rauch, at column 5, lines 58-60, as was used in rejecting Claim 9. Accordingly, comments of Applicant in response to the

rejection of Claim 9 also pertain to the rejection of Claim 13. Moreover, Applicant considers that Rauch neither teaches nor in any way intends that its switch matrix 22 could be put into a lockout mode, as defined by Applicant's specification and recited by Claim 13.

**VI. Response to Rejection of Claims 14-26**

Claim 14 recites both Feature (1) and Feature (2) of Claim 1. Accordingly, Claim 14 is considered to distinguish over the Rauch reference for the same reasons given in support for Claim 1, with regard to Features (1) and (2).

Claims 15-26 respectively depend from Claim 14, and are each considered to patentably distinguish over the art for the same reasons given in support thereof.

Claims 15, 19, 22 and 26 incorporate subject matter similar to the patentable subject matter of Claims 2, 6, 9 and 13 respectively, and are each considered to patentably distinguish over the art for the reasons given in support thereof.

**VII. Conclusion**

It is respectfully urged that the subject application is patentable over Rauch and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

DATE: November 1, 2005

Respectfully submitted,



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